

Meet the Stadtmans

Neat, Sweet, Unique

BY REBECCA BAKER (NIAID) AND L.S. CARTER

LUCA GATTINONI (NCI) TOOK HIS “first steps into science” as a toddler in the NIH Child Care Center when his parents were Visiting Fellows at NIH. Physicist **Kandice Tanner** (NCI) is drawn to motion, whether it’s from tumor cells migrating into new tissues or her own body hurtling through space while she’s skydiving. Developmental biologist **Todd Macfarlan** (NICHD) is intrigued with how viruses “are so intimately intertwined with our own evolution as a species.”

Indeed, all 11 members of the 2011–2012 cycle of Earl Stadtman Tenure-Track Investigators have a story to tell. They join 17 others in the Stadtman program—named for the legendary biochemist who worked at NIH for 50 years—that was launched in 2009 as an NIH-wide recruiting effort to attract outstanding scientists whose research areas span the biomedical fields.

And to continue with the introductions... RNA biology is “very exciting” to **Stavroula (Voula) Mili** (NCI), who studies cancer and neurodegeneration. **Sunni Mumford** (NICHD) is investigating how lifestyle and dietary changes may improve male and female reproduction and fertility. When she’s not trying to figure out the neuronal basis of natural behaviors, **Yeka Aponte** (NIDA) is preparing elaborate meals for her friends. Eye researcher **Kapil Bharti** (NEI) had dreamed all his life about becoming a

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A Life Collected

Joseph Edward Rall (1920–2008)

BY HANK GRASSO AND MICHELE LYONS, OFFICE OF NIH HISTORY



HANK GRASSO, OFFICE OF NIH HISTORY

This terra-cotta bas relief of Joseph Edward “Ed” Rall (background) and David Platt Rall (foreground) was created by sculptor Christian Peterson. These brothers each left an impression on biomedical research and NIH. Ed Rall served NIH as deputy director for intramural research from 1983 to 1991. David Rall was the director of the National Institute of Environmental Health Sciences (1971–1990) as well as the founding director of the National Toxicology Program.

WHEN JOSEPH “ED” RALL’S DAUGHTER, PRISCILLA RALL, DECIDED TO SHARE HER father’s history with the NIH Stetten Museum and the National Library of Medicine (NLM), she welcomed representatives from both to her home and amazed them with her family’s extensive historical collections. Pia Rall had painstakingly collected, organized, and preserved the evidence of her father’s life and work—his legacy—and was interested in returning some of these resources to NIH so that

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Nourishing Intramural Research for the Long Term

BY MICHAEL GOTTESMAN, DDIR

BOB DYLAN NOTICED IT IN 1963, AND 50 years later we scientists are seeing it again: “The times they are a-changin’.” The conduct of science is evolving even though resources are restricted; barriers to turning innovative ideas into reality keep springing up while being torn down elsewhere. We all know about the many contributions that the intramural research program (IRP) has made to modern biomedical research (and I hope you all have your elevator speech ready in case someone challenges you on this), but how can we best mold the future to assure its continued success? In the words of Lewis Thomas, “The National Institutes of Health [IRP] is not only the largest institution for biomedical science on earth, it is one of this nation’s great treasures. As social inventions for human betterment go, this one is a standing proof that, at least once in a while, government possesses the capacity to do something unique, imaginative, useful, and altogether right.”

For the past nine months, I have been meeting with NIH leadership to discuss how to prepare ourselves for the future. In January, I discussed a proposal for long-term planning for the IRP at the Leadership Forum of Institute Directors. In February the NIH scientific directors (SDs) met for their annual retreat—in the new FAES conference center in the Clinical Center—sleeves rolled up and ready to work. With the encouragement of NIH Director **Francois Collins**, we have worked out a plan to develop a blueprint for the future of the IRP.

The planning process will begin at the level of our institutes and centers (ICs) with

committees of our NIH experts and outside experts formulating a 10-year scientific vision for each of the ICs and determining what will be needed to accomplish these goals. These ideas will be discussed by the SDs and by a committee of institute directors, and the common themes that emerge will be identified and integrated into a single document.

My hope is that this process—beginning within the NIH with outside encouragement and support—will inspire creative, farsighted thinking. I know that for some IRP scientists, planning of this sort generates angst. I have detected that some of you don’t feel included in the process. And yet this is an inclusive process that will flounder without broad input. So, inclusive planning was the main topic for the 2014 IC Directors’ and SDs’ retreats. Collins opened both discussions and, in short, asked us to focus on the types of science that we do best. He charged us to articulate visionary goals and identify barriers to achieving these goals. He stressed the enthusiastic Congressional interest in the value and benefits of our research. He spoke eagerly of exciting scientific opportunities that have emerged in the past few years.

This 10-year vision is just the beginning. We encourage all NIH scientists to contribute innovative ideas about how we can continue to use the valuable resources of the IRP in laboratory science, clinical resources, and population-based programs to advance basic biomedical research and clinical applications. You are in a unique position to provide a bold vision for the future of the NIH IRP, with your keen insights into the special characteristics of this place.

Please send your best ideas to your scientific director and me for further consideration by the IC-based review groups. Once these individual groups have assembled their recommendations, we will identify common themes and goals. Before the end of the year, we will ask the Advisory Committee to the Director, comprising outside advisors, to review our efforts.

Think big. Think not what you could do with one more postdoc or a few more dollars. Instead think of unrealized synergies and focused investments for collaborative science to take on major scientific questions. ●

“Elevator Speech” Excerpt

VISITOR: What’s so great about the IRP?

IRP SCIENTIST: Remember Marshall Nirenberg and the genetic code, Julius Axelrod and humoral transmitters? Fluoride for tooth decay; lithium for bipolar mental illness; blood tests to detect HIV and hepatitis; the first AIDS drugs; the first vaccines against hepatitis, Hemophilus influenza, and human papillomavirus? That’s the IRP. We’ve had 20-some Nobel Prize winners and 30-some Lasker winners.

VISITOR: But has the IRP done lately?

IRP SCIENTIST: Ketamine to reduce suicidal tendencies; immunotherapy to cure cancer; discovery of genes involved in stuttering and countless other disorders; world’s leader in MRI technology; Undiagnosed Diseases Program; world’s largest hospital dedicated to clinical studies...

Continue the ride at <http://irp.nih.gov/our-research/accomplishments>.

What's Past Is Prologue

Reflections on NIH Alumnus André Van Steirteghem

BY ALAN N. SCHECHTER, NIDDK

AS MY FIFTIETH ANNIVERSARY AS AN NIH scientist nears in this period of stress for NIH and its Intramural Research Program (IRP), I am reminded of how fortunate I have been to be on the staff of this institution. I am also optimistic that the past can continue to be prologue to the future. I realize that little of what we do is predictable and that, often, our contributions are from unanticipated developments.

The recent visit of **André Van Steirteghem**, one of the leaders in the field of in vitro fertilization (IVF) and now an emeritus professor of embryology and reproductive biology at Vrije Universiteit (the Free University) in Brussels, was such an occasion. In December 2013, he came to NIH to deliver a lecture in which he recounted his work in developing and leading the renowned IVF program at the university's medical school since the early 1980s. His program has been responsible for about 20,000 successful pregnancies. In addition, André pioneered the Intracytoplasmic Sperm Injection (ICSI) technique in which a single sperm is injected directly into an egg.

Before he ever got into the IVF business, he trained at NIH (in the 1970s) in something quite different. Even though I have been immersed in hemoglobin research for almost 40 years, I was his prime mentor. André had come to the Clinical Center from Brussels as a fellow to work in the clinical chemistry department with **Mark Zweig**. They decided to use radioimmunoassays to measure plasma concentrations of the muscle and brain creatine kinase isoenzymes for improving the diagnoses of cardiac and other diseases. André and Mark had little knowledge of the needed protein purification, immunological, and labeling techniques to develop these relatively novel assays.

That's where I came in. I was a newly

minted protein chemist—having worked for a decade with **Christian Anfinsen** (who was a co-recipient of the Nobel Prize in Chemistry in 1972 for his work on protein folding)—on top of my medical training. I found André space in my lab and we started some classical, but inelegant, purification procedures.

When André returned to Brussels in 1977, the physicians in his university's obstetrics and gynecology department were happy with his new expertise and hired him to develop radioimmunoassays for use in fertility studies.

In July 1978, Robert Edwards and Patrick Steptoe in England announced the first successful use of IVF that culminated in the birth of a healthy infant—Louise Brown. André and his colleagues journeyed to England, as well as to IVF centers in other countries, to learn the methods used. In 1983, with André as the laboratory director of the newly created Brussels IVF center, the first IVF child was born in that facility.

I sometimes think that André has accomplished more direct benefits for humankind than any other person with whom I had the privilege to work at NIH. André's training at NIH provided a foundation that helped launch his career even though it took off in an unexpected direction.

Are there important lessons to be learned? As one who contributed to the NIH booklet "A Guide to Training and Mentoring in the Intramural Research Program," I have been long concerned with such questions and I think the answer is "Yes."

First, contrary to what is commonly expected, few trainees will, or should, follow in the narrow pathway of their mentors with regard to the questions to be asked and the methods to be used. Second, the ultimate utility of any research program is often in



André Van Steirteghem, one of the leaders in the field of in vitro fertilization and an NIH alum, visited NIH recently.

fields that are different from what was anticipated. Third, the research "focus" that review committees often demand may not be ideal for making true advances in health research.

Fortunately, the IRP has a tradition of fostering an environment that allows scientists to take risks that include venturing outside of their fields. Furthermore, research organizations flourish when there's continuous interaction among investigators from many disciplines and institutions.

It's my hope that with NIH's resources and enlightened leadership—human and technical, basic and applied, clinical and scientific, immediate and long-term—the IRP can and should continue to help spawn major new medical advances in the years ahead. ●

To watch a video of André Van Steirteghem's December 20, 2013, Mortimer B. Lipsett Memorial Lecture entitled "35 Years after the Birth of Louise Brown: What Have We Achieved and What Are the Current and Future Challenges," go to <http://videocast.nih.gov/launch.asp?18219>.



FROM NCI'S TRAINING OFFICE

Mentoring for the Postdoctoral Fellow

BY JONATHAN S. WIEST, DIRECTOR, CENTER FOR CANCER TRAINING, NCI

SO WHAT IS MENTORING? THIS IS A VERY important and difficult question and one that is often answered with, “We know it when we see it.” This isn’t very satisfying. If we can’t describe it, measure it, or delineate it, then how can we find it?

The notion of mentoring is an ancient one. The word “mentor” comes from Homer, who described the original Mentor as the “wise and trusted counselor” whom Odysseus left in charge of his household. A few things come to mind as I think about this quote. First, the mentor should be wise and trusted, and second, they should be a counselor. Lastly, the relationship is between two people. This last point causes me the most concern in the current training environment.

As Ph.D.s we look to the science for our direction. The science is what we are passionate about and it drives us to succeed. To be an “independent” investigator, you must spend vast amounts of time pursuing your goals. Passion helps you to sustain your drive.

However, finding a scientist who is passionate about the same things that fascinate you is not the best way to choose a mentor. Often the people doing the most interesting science are not the best mentors. The mentor–trainee relationship is a one-to-one relationship, and the mentor should see more potential in you than you can see in yourself. And, the mentor should be someone who is willing to spend the necessary time with you to help you to achieve your career goals.

When I was training Ph.D. students at the University of Cincinnati, students did rotations through laboratories to get a sense of which faculty they could work well with and which science or projects were the most interesting to them. It also gave the investigators time to interact with the students to see whether they could mentor them productively.

In the current postdoctoral training atmosphere, investigators are hiring staff to assist them in moving their projects forward. Often interviews are done over the phone. Although the science may be interesting to both the mentor and the trainee, there is no provision for the two parties to interact to test the relationship. What happens if I bring someone into my group that I don’t feel I can adequately mentor? Now I have made a commitment to them. How do I make this relationship work?

To address these issues, I recommend that the potential mentor and trainee have in-depth conversations with each other in advance. Together, the two individuals should talk about their expectations and come to an agreement. Discussion topics might include the amount of independence the trainee requires, the number of publications expected, how much time the mentor expects the trainee to spend working, how many meetings the trainee will attend each year, and whether the projects can be continued once the trainee moves on.

Just as important, it is crucial to remember that the mentor–trainee relationship is dynamic. These conversations should continue at least annually throughout the course of the relationship because some expectations and goals will change for both individuals. Good communication will help to minimize problems. Part of good communication is listening, which is an important skill that both parties need to practice. Pay attention to each other’s needs and goals and you will find success as you work toward your common goals. ●

This article is reprinted with permission and first appeared in the Summer 2004 issue of the *POSTDOCKET*, the quarterly newsletter for the National Postdoctoral Association.

NIH ABBREVIATIONS

CBER: Center for Biologics Evaluation and Research, FDA
CC: NIH Clinical Center
CCR: Center for Cancer Research, NCI
CDC: Centers for Disease Control and Prevention
CIT: Center for Information Technology
DCEG: Division of Cancer Epidemiology and Genetics, NCI
FAES: Foundation for Advanced Education in the Sciences
FARE: Fellows Award for Research Excellence
FelCom: Fellows Committee
FDA: Food and Drug Administration
FNL: Frederick National Laboratory
IRP: Intramural Research Program
HHS: U.S. Department of Health and Human Services
NCATS: National Center for Advancing Translational Sciences
NCCAM: National Center for Complementary and Alternative Medicine
NCBI: National Center for Biotechnology Information
NCI: National Cancer Institute
NEI: National Eye Institute
NHGRI: National Human Genome Research Institute
NHLBI: National Heart, Lung, and Blood Institute
NIA: National Institute on Aging
NIAAA: National Institute on Alcohol Abuse and Alcoholism
NIAID: National Institute of Allergy and Infectious Diseases
NIAMS: National Institute of Arthritis and Musculoskeletal and Skin Diseases
NIBIB: National Institute of Biomedical Imaging and Bioengineering
NICHD: Eunice Kennedy Shriver National Institute of Child Health and Human Development
NIDA: National Institute on Drug Abuse
NIDCD: National Institute on Deafness and Other Communication Disorders
NIDCR: National Institute of Dental and Craniofacial Research
NIDDK: National Institute of Diabetes and Digestive and Kidney Diseases
NIHES: National Institute of Environmental Health Sciences
NIGMS: National Institute of General Medical Sciences
NIMH: National Institute of Mental Health
NIMHD: National Institute on Minority Health and Health Disparities
NINDS: National Institute of Neurological Disorders and Stroke
NINR: National Institute of Nursing Research
NLM: National Library of Medicine
OD: Office of the Director
OITE: Office of Intramural Training and Education
OIR: Office of Intramural Research
ORS: Office of Research Services
ORWH: Office of Research on Women’s Health
OTT: Office of Technology Transfer

The NIH 3D Print Exchange

Exploring Molecules and Building Labware

BY SARA CROCOLL, PRESIDENTIAL MANAGEMENT FELLOW, NIAID

It's NOT QUITE A STAR TREK REPLICATOR, but it comes close: a three-dimensional (3-D) printer. The fictional replicator rearranges subatomic particles to make food, water, spare parts, and more. The very real 3-D printer translates digital computer files into custom laboratory equipment as well as models of biomolecules, cells, organisms, and anatomical features. Using an additive manufacturing process, the printer spits out successive thin layers of material until an object is formed.

You may have heard whispers about 3-D printing at NIH or visited the exhibit at the NIH Research Festival in November and witnessed objects materializing, as if by magic, before your eyes. With these complex 3-D models, researchers can often examine and explain their work better than they can with 3-D models on computer screens.

“Over the last several years, 3-D printing has...allowed our scientists to gain invaluable insight into [the] structure and function of...molecules,” said Deputy Director for Science Management **John J. McGowan**, of the National Institute of

Allergy and Infectious Diseases (NIAID). “When they hold the different molecules in their hands, they have been able to see important aspects of how they bind [and] expose a surface that is not always easily detected by looking at a computer model on a computer screen.”

The 3-D technology is already widely used in industry to build prototypes. In the world of contemporary art, design, and architecture, 3-D printing is playing an increasingly important role, too. But in the world of biomedicine, 3-D printing is just beginning to take hold. Currently, however, there's a shortage of the expertise required to generate and validate scientific digital models that can be converted into 3-D objects.

The new NIH 3D Print Exchange, set to open this spring, aims to fill this gap by creating an online portal where researchers and educators can download biomolecular digital files that can be printed on a desktop 3-D printer or via a 3-D printing service provider. A few institutes already have their own printers. Soon the NIH Library—through its Technology Sandbox—plans

to offer access to a 3-D printer, too.

The Exchange is a collaborative effort led by NIAID in partnership with the *Eunice Kennedy Shriver* National Institute for Child Health and Human Development and the National Library of Medicine. It received initial funding from the U.S. Department of

Health and Human Services' HHS Ignite program. HHS Ignite, which was launched in 2013, supports early-stage projects that can be completed in three to six months (<http://www.hhs.gov/open/initiatives/ignite>).

The NIH 3D Print Exchange provides a growing database of high-quality, scientific 3-D digital models of biomedical and biomolecular structures derived from microscopy, crystallography, and imaging. “We hope that users will share and use custom lab equipment and gadgets,” too, said **Darrell Hurt**, leader of the Exchange and head of NIAID's Computational Biology Section. “The added value of our Web site is that it is a trusted resource for sharing and that it has tools built in to easily create printable objects from primary scientific data.” And 3-D printing saves time and money, too.

“It has been well worth the small investment made to provide this service to the intramural programs,” said McGowan.

One day 3-D printers may be able to make things that even Star Trek replicators can't. Scientists have already begun to use 3-D technology to make body parts, such as ears, as well as replicas of human organs for research purposes. The technology is too new to create transplantable organs, but perhaps some day...

So for now, if you are looking for new ways to visualize or explain the molecules you're studying or you want to create customized labware, 3-D printing is an avenue you might want to explore. ●

To learn more, visit:

- NIH 3-D Print Exchange: <http://3dprint.nih.gov> or e-mail 3dprint@nih.gov
- NIH Library Technology Sandbox: <http://1.usa.gov/1mtMsKZ>
- Video: <http://www.youtube.com/watch?v=rD9CWD51lj4>



JEREMY SWAN, NICHD

NIAID's Airwolf 3-D printer making an ebola virus model. Photo by Jeremy Swan (NICHD) who spearheaded the popular 3-D printing exhibit at the 2013 NIH Research Festival.



Sickle-Cell Disease in Africa

An Interview with Tanzanian Researcher Julie Makani

BY HELENE BLANCHARD, NIA



Tanzanian researcher Julie Makani spent several months at NIH doing a sabbatical at the Clinical Center as part of an effort to integrate Western and African knowledge to improve the care of people with sickle-cell disease.

JULIE MAKANI, A TANZANIAN INVESTIGATOR, just completed a three-month sabbatical at NIH as part of an effort to integrate Western and African knowledge to improve the care of people with sickle-cell disease (SCD). Makani first came to NIH on February 13, 2013, to give a talk for the Wednesday Afternoon Lecture Series (WALS) on “Sickle Cell Disease: What Can Africa Contribute?” in which she talked about leveraging existing resources in Africa and the United States to develop SCD programs that integrate health care, education, and research.

SCD is a group of inherited red-blood-cell disorders in which the red blood cells become hard and sticky and are C, or sickle, shaped. These cells die early, clog blood flow, and can cause painful episodes, serious infections, organ damage, and anemia. Worldwide 300,000 babies are born with SCD each year, with more than 70 percent on the African continent. SCD is a major cause of infant mortality in sub-Saharan

Africa. Tanzania has recognized SCD as a major public-health problem and is using SCD as a model to establish scientific and technological solutions that are locally relevant but have global significance.

When Makani was at NIH for the WALS lecture, she met with Clinical Center Deputy Director for Educational Affairs and Strategic Partnerships **Fredrick Ognibene**, who oversees the Sabbatical in Clinical Research Management program. The sabbatical program, which was launched in 2009, is self-directed training for experienced investigators and managers and includes one-on-one meetings with and demonstrations by experts in clinical-research management as well as other training opportunities. So far 23 investigators from 16 institutions in the United States and abroad have participated. Makani applied and was accepted into the program in the fall of 2013.

In January 2014, Makani returned to Tanzania to her position as a tenured faculty member and consultant physician at the Muhimbili University of Health and Allied Sciences (MUHAS) in Dar es Salaam, Tanzania. MUHAS is the main clinical, academic, and research center in Tanzania. She is also a Wellcome Trust research fellow in the Nuffield Department of Medicine at the University of Oxford (Oxford, England). She plans to return to the NIH in mid-2014 to spend more time in the sabbatical program.

The following is an edited interview.

CATALYST: How did you decide to do a sabbatical at NIH?

MAKANI: When I was at NIH for my WALS lecture, I met with several outstanding NIH scientists including NIH Director **Francis Collins**, NHLBI Director **Gary Gibbons**, NIDDK Director **Griffin**

Rodgers, and Fogarty International Center Director **Roger Glass**. I learned that NHLBI has led an extensive research program on sickle-cell disease (SCD) since 1972 and has committed more than \$1 billion to improving the understanding of the disease and identifying new methods of treatment, management, and prevention. Although many studies have been performed in the United States, Europe, and Jamaica, more research is needed to understand the disease in Africa. NIH can influence SCD research by moving forward the research agenda globally.

CATALYST: What did you do during your sabbatical and what did you like especially?

MAKANI: I focused on various aspects of clinical-research management, such as data management, laboratory testing methods, and patient-recruitment issues. I liked the one-on-one training, the opportunity to have discussions with NIH experts, and being able to tailor the program to my interests. I also liked doing a sabbatical at the United States’ largest hospital totally dedicated to clinical research and being able to collaborate with NIH researchers.

CATALYST: Who will your collaborators be?

MAKANI: I hope to collaborate with NHLBI Deputy Director **Susan Shurin**, my host during my sabbatical. She helped me identify other potential collaborators. I met with **Courtney Fitzhugh** and **Caterina Minniti** at NHLBI to discuss genotyping SCD patients on different continents to look at epigenetic (environmental) influences on phenotype. I am also collaborating with **Nancy Geller** and **Neal Jeffries**, both in NHLBI’s Office of Biostatistics Research, on data analysis. In addition, I

hope to continue discussions with other institutes such as the Fogarty International Center and NHGRI, which is involved in the H3Africa initiative (Human Heredity and Health in Africa Consortium).

CATALYST: What might you be doing differently based on your sabbatical?

MAKANI: I will be developing partnerships in research, health care, and training; facilitating joint research projects between scientists in Tanzania and the United States; improving my scientific writing, thanks to courses I took at the NIH library; and proposing changes in the laboratory diagnosis of SCD based on my training on hemoglobinopathy diagnosis. I will also encourage colleagues to participate in NIH's sabbatical program to receive further training in laboratory diagnosis, research administration, and management. In addition, we hope to formalize a partnership between MUHAS and the NIH Clinical Center to develop virtual courses and exchange programs.

CATALYST: What additional research is needed on SCD?

MAKANI: We need to conduct research on diversifying treatment options and alleviate the burden of this pathology in Africa. For example, why does pain vary so much in terms of severity, frequency, and duration within a population or for an individual? In addition, the disease has been known for a century, but there is only one drug to treat it.

CATALYST: What do you see as the challenges in SCD patient care?

MAKANI: Infants and children with SCD are more at risk for infections. There are two critical needs: screening newborns to detect SCD early, and preventing infections by generalizing the use of penicillin

and promoting vaccination. Those measures, which were developed in the United States, reduced the mortality, but they have yet to be implemented in Africa. Blood transfusion is also key in SCD patient care and could be done using existing tools from the PEPFAR (The United States President's Emergency Plan for AIDS Relief) program, such as care centers and trained health-care providers.

CATALYST: What else needs to be done?

MAKANI: It's important to integrate health care, advocacy, research, and training in public-health issues. My goal is to use research to support the three others. Stakeholders have to work together. For example, advocacy is supported in Tanzania via the Sickle-Cell Foundation of Tanzania (<http://lms.muhas.ac.tz/sicklecelltz>) and the Ministry of Health. The efficient implementation of policies is crucial to the improvement of health care. We need better training of health-care providers regarding the treatment and management of SCD complications. The mortality in hospitals is still too high.

CATALYST: Is there anything else?

MAKANI: While there are still challenges to improving SCD patient care and treatment, I want to emphasize the extensive efforts being made by researchers and public-health stakeholders in Africa. My main objective is to invest in science and use science to improve health in a way that can be applied far beyond the SCD context. ●

To see Julie Makani's WALs lecture go to <http://videocast.nih.gov/launch.asp?17804>.

For more information on the Clinical Center sabbatical program, visit <http://www.cc.nih.gov/training/sabbatical>.

New HR Systems in 2015

BY JENNIFER LEVITHAN AND STACIE RAPPAPORT, OD

The Department of Health and Human Services (HHS) will be moving to new human resources (HR) systems that will replace myPay, the Integrated Time and Attendance System (ITAS), and Capital HR (EHRP) with interconnected systems. HHS is calling this effort the HR Modernization Program, also referred to as the National Finance Center (NFC) Migration. HHS anticipates the systems migration will occur in the fall of 2015.

The new NFC systems is a suite of integrated systems offering enhanced functionality, reduced costs, improved data accuracy, and standardized processes throughout HHS.

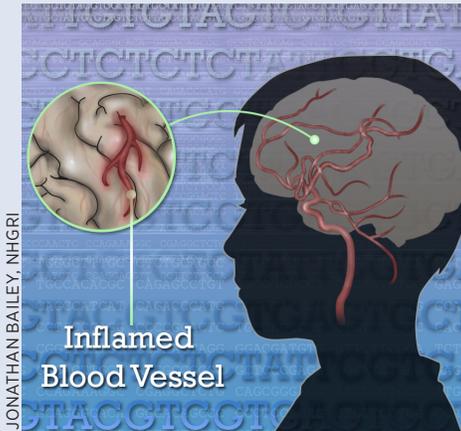
The NIH teams are working hard to ensure that the data housed in NIH's HR systems is current and accurate so there will be a smooth transition when the new systems deploy. Internally, the NIH HR Modernization Program Team has delivered presentations to administrative officers, executive officers, and other groups to keep NIH staff informed of this effort. Volunteers from institutes and centers have also been selected to participate with HR staff on several of the subproject teams. Cross-NIH involvement helps ensure that all of NIH's needs are represented.

As NIH gets closer to the implementation date, the HR Modernization Program Team will ensure that NIH is thoroughly prepared for the new systems. The team will provide plenty of change-management tools for NIH staff such as Web sites, training, and user guides, in addition to ongoing communications.

For more information, go to <http://hr.od.nih.gov/hrsystems/nfcmigration.htm>. You may also join the HR Modernization Yammer group; for information on how, go to <http://hr.od.nih.gov/hrsystems/benefits/nfc/nfcyammergroup.htm>. For other questions, e-mail NFCMigration@mail.nih.gov. ●



Intramural Research Briefs



JONATHAN BAILEY, NHGRI

A variation in the gene that codes for a key blood-vessel enzyme causes a rare disease in children that makes them prone to fevers, rash, and strokes. The discovery of what underlies this blood-vessel disease may also benefit efforts to treat and prevent stroke in general.

NHGRI, NHLBI, NIAID, NIAMS, NCI, NIDDK, CC: DISCOVERY OF A GENETIC DISORDER THAT CAUSES STROKES AND VASCULAR INFLAMMATION IN CHILDREN

A team of intramural scientists from seven NIH institutes and centers have identified gene variants that cause a rare syndrome of sporadic fevers, skin rashes, and recurring strokes, beginning early in childhood. The NIH group first encountered a three-year-old patient with the syndrome approximately 10 years ago, but did not at first suspect a genetic cause and treated the patient with immunosuppressive medications.

Several years passed, but then two unrelated children with very similar symptoms came to NIH. The researchers began to suspect a common genetic cause and embarked on a medical odyssey that has led not only to a diagnosis, but also to fundamental new insights into blood-vessel disease. The scientists sequenced and analyzed the exomes—the protein-coding part of the genomes—of all three affected children and their unaffected parents.

When the researchers examined the genetic data, they discovered all three children had two mutated copies of the *CECR1*

gene—one copy from each of their parents. In contrast, their parents each carried one normal copy and one mutated copy of the *CECR1* gene.

The *CECR1* gene codes for an enzyme called adenosine deaminase 2 (ADA2), which is crucial for blood-vessel development and maintaining the balance of key immune cells called monocytes and macrophages. The mutated copies of *CECR1* found in the young patients impair their ability to produce the ADA2 enzyme. This ADA2 deficiency, the researchers found, leads to vascular and immune system abnormalities that promote a vicious cycle of inflammation that, in turn, raises the risk of stroke.

The discovery of what underlies this rare blood-vessel disease may also benefit efforts to treat and prevent a much more common vascular disorder: stroke. (NIH authors: Q. Zhou, D. Yang, D.L. Kastner, M. Boehm, I. Aksentijevich, et al.; *N Eng J Med* DOI:10.1056/NEJMoa1307361)

NIDDK, NICHD, NCI: SHIVERING MAY BOOST HEAT-PRODUCING BROWN FAT IN HUMANS

When NIH researchers explored how hormones regulate physiologic responses to cold exposure in humans, they uncovered an intriguing relationship between shivering, brown fat, and exercise. (NIH authors: P. Lee, J. Linderman, S. Smith, R. J. Brychta, J. Wang, C. Idelson, R.M. Perron, C.D. Werner, G.Q. Phan, U.S. Kammula, E. Kebebew, K. Pacak, K.Y. Chen, F.S. Celi; *Cell Metab* 19:302–309, 2014) Read more online at <http://irp.nih.gov/catalyst/v22i2/research-briefs>.

NIDCR: P38 IS HIGHLY ACTIVE IN HEAD AND NECK CANCERS

Better treatment options are needed for people diagnosed with head and neck cancers because the current therapies of surgery, radiation therapy, and chemotherapy control cancer at the cost of normal tissues, sometimes damaging them permanently. An NIDCR-led team of scientists reported that p38 kinase is active in

head and neck cancer cells and blocking p38 may help prevent cancers from growing.

The team tested SB203580, a drug known to block p38 activity. As expected, SB203580 reduced the growth of head and neck cancer cells in the lab. The next step will be to test a new generation of drugs that inhibit p38. (NIH authors: K. Leelahavanichkul, P. Amornphimoltham, A.A. Molinolo, J. S. Gutkind; *Mol Oncol* 8:105–118, 2014)

OTT: NIH'S SUCCESS IN DRUG DEVELOPMENT

Compared with other U.S. public-sector research institutions, the NIH Intramural Program (IRP) has contributed inventions that have had a disproportionately greater impact on the overall number of products produced (particularly vaccines, cancer therapeutics and in vivo diagnostics), drugs granted orphan status, and drugs granted priority review because they offer major advances in treatment.

The drugs referred to are powerhouse medications and vaccines such as paclitaxel (Taxol), live oral tetravalent Rotavirus vaccine (RotaShield, now being tested in Africa), bortezomib (Velcade), quadrivalent human papillomavirus vaccine (Gardasil), and darunavir (Prezista). The total global net sales of drugs using inventions developed by the NIH-IRP was nearly \$7 billion in 2010. In the past two decades, the NIH-IRP has contributed more than 14 percent of the total number of drugs brought to the market under commercial licenses from public-sector research institutions while receiving about 11 percent of all NIH research funds to these institutions (not including the non-NIH funding universities receive). (OTT authors: S.K. Chatterjee, M.L. Rohrbaugh; *Nat Biotechnol* 32:52–58, 2014) ●

Read additional briefs and expanded versions of these online at <http://irp.nih.gov/catalyst/v22i2/research-briefs>.

CONTRIBUTOR: KRISTEN CARRERA, NIDDK

The Myriad Decision

A Move Toward Trade Secrets?

BY CHRIS PALMER, NCI

ARE GENES PATENTABLE? IN JUNE 2013, the U.S. Supreme Court, ruling on the case *Association for Molecular Pathology v. Myriad Genetics, Inc.*, answered that question with a resounding “No.”

The unanimous ruling on the case, in which doctors, patients, and medical associations sued biotech firm Myriad Genetics to challenge its patents on two human genes, *BRCA1* and *BRCA2*, has been viewed as a potential turning point for the biotech industry’s thinking about intellectual property (IP) protection. A discussion of the fallout from the landmark case, and how various players in the research community may react to it, was the basis of the NCI-hosted Ethical and Regulatory Issues in Cancer Research (ENRICH) Forum in November.

Leading the ENRICH Forum, entitled “The Myriad mire: Patents and trade secrets in the age of the genome,” were **Mark Rohrbaugh**, director of NIH’s Office of Technology Transfer, and Eleonore Pauwels, public policy scholar at the Woodrow Wilson International Center for Scholars (Washington, D.C.). Rohrbaugh, who participated in discussions about a “friend of the court” brief detailing the federal government’s position on the case, discussed the background and logic behind the Supreme Court’s decision, whereas Pauwels laid out the business, ethics, and policy implications of the ruling.

Between 1997 and 1998, researchers at Myriad Genetics and the University of Utah (both based in Salt Lake City) and NIEHS were granted patents for the *BRCA1* and *BRCA2* genes. (Note: NIH was not included in the *BRCA2* gene patent.) Mutations in the genes have been associated with a predisposition to breast

and ovarian cancers, making diagnostics based on the genes important for the health of millions of women worldwide.

The U.S. Supreme Court ultimately ruled in June 2013 that isolated human genes cannot be patented. However, the justices also ruled that synthetic DNA sequences—known as complementary DNA (cDNA)—are eligible for patent protection, leaving room for biotech firms to profit from genetics research.

In an attempt to explain Myriad’s choice to patent the *BRCA* genes, Rohrbaugh outlined two general strategies companies use to protect IP. A company can obtain a patent in exchange for making public a written description of how to make its invention, as well as demonstrating that it is novel, nonobvious, and not a product of nature. The trade-off is that the patent is only enforceable for 20 years. Alternatively, the company can declare its invention a trade secret—for example, Google’s search algorithm—indefinitely and hope nobody uncovers the secret to create a similar product. (For technologies based on genome sequences, all of which are now publicly available, this should not pose a serious problem to the development of gene sequence-based tests.)

According to Pauwels, the Supreme Court decision on Myriad could make the trade-secret route look more attractive to the biotech industry, including to Myriad itself. She quoted a 2011 *New York Times* piece in which Myriad’s chief executive, Peter Meldrum, said, “If I had my druthers, I would not want to go into a new market in a heavy-handed fashion, trying to enforce patents.” Pauwels said this attitude is likely to be shared by other biotechs and that business models in a post-Myriad world may focus on keeping secret innovations regarding the

peripheral aspects of gene discovery—analysis algorithms, sequencing technologies, and gene databases.

Pauwels also discussed the merits of making gene databases public. She mentioned a handful of policies that could ensure data sharing, including scientific journals creating and promoting voluntary public databases; FDA requirements for labs to share data as a condition of market approval of genetic tests; and insurer requirements that labs share data as a condition of reimbursement.

Rohrbaugh ended his portion of the forum by describing NIH’s best practices—first issued in 2005—for NIH-funded institutions wishing to license genomic inventions. He said patent seekers should avoid exclusive licensing—that is, allowing only a single company to produce a patented product—to the extent possible, unless doing so would provide commercial development incentives.

He recommended that patent seekers should always make sure they have the right to grant nonexclusive research-use licenses to lots of people rather than to a single company or lab. He also suggested setting up specific goals for the production and testing of therapeutics with definite timelines to facilitate the quick development of the licensed technology.

Such benchmarks would increase the likelihood that the patented invention is put to use improving people’s health and not gathering dust on a shelf. ●

For more information about the Office of Technology Transfer and inventions by NIH researchers, go to <http://www.ott.nih.gov>. To read a longer version of this article online, go to <http://irp.nih.gov/catalyst/v22i2/the-myriad-decision>.

Rall Collection
CONTINUED FROM PAGE 1

his voice would always be found there. Ed Rall did groundbreaking research on the thyroid, founded one of the world's leading thyroid centers at NIH, and was an inspirational force in NIH's intramural program.

The story of NIH's efforts to preserve the Rall collection is one of collaboration between the DeWitt Stetten, Jr., Museum of Medical Research (part of the Office of NIH History) and the NLM's History of Medicine Division. Both entities advance the historical understanding of biomedical research, albeit in different ways.

The Stetten Museum collects, preserves, and interprets three-dimensional objects associated with NIH researchers and their contributions to biomedicine.

NLM's History of Medicine Division collects, preserves, and interprets books and other printed materials, images, audiovisuals, and original documents related to the general history of medicine and not just what happened at NIH.



Nell Platt Rall and Edward Everett Rall with their sons, Ed (left) and David. The elder Rall was president of North Central College in Naperville, Illinois. From *Recollections or Apologia per Vita sua*, 2002: "I arrived in this world in 1920 born in the President's House...just across from the College Library—a Carnegie Library, of course...School appeared to me to be neither good nor bad except that having to do endless examples of long division...was particularly boring."



Because Rall's narrative is international in scope, it is important not only to NIH's history but also to the global history of medicine.

"It is always a pleasure working with our colleagues in the Office of NIH History, and especially so on the Rall collection," said **Jeffrey Reznick**, chief of NLM's History of Medicine Division. "Together, we are ensuring that this unique collection as a whole is both preserved for and accessible to current and future generations of historians and other interested researchers, as well as for educators, students, and the general public, all of whom deserve to know about the record of Dr. Rall's accomplishments in terms of NIH history as well as the history of medicine overall."

To capture a complete record of a scientist's professional contributions and to accurately reflect the how, why, and what of that work, the record must also document, to the extent possible, the scientist's daily life, the environment in which he or she lived and worked, and his or her worldviews and perspectives.

The Rall collection does just that. The Rall family has donated many three-dimensional objects to the museum including Rall's stethoscope, slide rules, cameras, typewriter, microscope, Marshall Island radiation field-research notebook, U.S. Army footlocker, 1946 desk photocalendar, tobacco pipe, miniature chess set, NIH lab coat, and some of his awards and medals. The museum's collection also includes

digitized copies of some family photographs and papers. The family has donated archival materials—including correspondence, speeches, notebooks, oral histories, photographs, moving images, recordings, and other documents—to the library.

The collection paints a picture of Ed Rall's life and accomplishments. He was among the first to apply radioactive isotopes of iodine to the study of thyroid function and the treatment of thyroid diseases. He studied under Raymond Keating, Alexander Albert, and Marschelle Power at the Mayo Clinic (Rochester, Minn.), receiving the Van Meter Award in 1950 for his residency work. He then moved to the Memorial-Sloan Kettering Cancer Center (New York), where he was engaged in the early development of treatments for metastatic thyroid cancer with radioactive iodine and became a key member of the team of radiation physicists and clinicians treating patients.

In 1955, Rall was invited to start the Clinical Endocrinology Branch at the National Institute of Arthritis and Metabolic Diseases (NIAMD), the forebear of the current National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) and the National Institute of Arthritis and Musculoskeletal and Skin Disease (NIAMS).

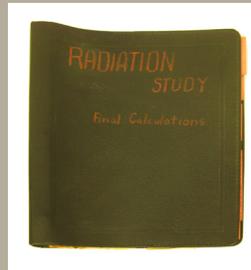
At NIH, Rall assembled an array of scientists from different disciplines to focus on a single endocrine organ, the thyroid. His visionary approach led to the creation of one of the world's leading

LEFT

The Rall family donated archival materials—including correspondence, speeches, notebooks, oral histories, photographs, moving images, recordings, and other documents—to the National Library of Medicine.

RIGHT

Ed Rall's family has donated many three-dimensional objects to the Stetten museum including his stethoscope, slide rules, microscope, Marshall Island radiation field-research notebook, U.S. Army footlocker, 1946 desk photocalendar, tobacco pipe, miniature chess set, NIH lab coat, some of his awards and medals, and more.



centers for basic and clinical thyroid research. In 1957, Rall was one of a group of scientists, under the auspices of the Atomic Energy Commission, that was sent to the Marshall Islands to study the effects of radiation on the inhabitants of the Rongelap and Utirik Islands from a nuclear testing accident. Rall helped to introduce preventative treatment with thyroid hormones to reduce the incidence of thyroid nodules and cancers.

In 1959, Rall was off to the Soviet Union as part of an official exchange mission. In 1960, he and **Jack Robbins**

(an NIDDK scientist who died in 2008) published a famous paper, “Proteins Associated with the Thyroid Hormones,” which described their theory that only free thyroid hormone is the active hormone (*Physiol Rev* **40**:415–489, 1960).

Rall was NIAMD's scientific director for more than 20 years before becoming NIH's Deputy Director for Intramural Research (1983–1991). His tenure was marked by his wide interdisciplinary interests and involvement with fellows and training programs. He transitioned to emeritus status in 1995.

Born in 1920 to North Central College (Naperville, Ill.) president Edward Everett Rall and his wife, Nell Platt Rall, Ed Rall earned his B.S. in zoology from that college in 1941 and his M.S. and M.D. from Northwestern University Medical School (Chicago), now the Feinberg School of Medicine at Northwestern. He received his Ph.D. from the University of Minnesota (Minneapolis) in 1945 and left for a fellowship at the Mayo Clinic.

His wife, Caroline Domm Rall, whom he met as a child and married in 1944, also had a B.S. in zoology. Rall's residency at the Mayo Clinic was interrupted by a two-year stint in the U.S. Army Medical Corps, where he served at Fort Devens (Ayer and Shirley, Mass.) and at a U.S. Army base in Nürnberg, Germany.

Through the generosity of Priscilla Rall and the Rall family, this unique and valuable collection will be available for researchers of both today and tomorrow, all of whom will be able to read and learn from Ed Rall's thoughts and perceptions. Quotes mined from his letters and notes will enable Ed Rall himself to narrate the milestones and transitions of his personal and professional life in his own vernacular, personality, and cadence. And museum exhibitions, popular and scholarly press publications, Web-based presentations, curriculum materials, and documentary films that feature his voice will resound with accuracy and authenticity.



In 1957, Rall was one of a group of scientists that was sent to the Marshall Islands to study the effects of radiation on the inhabitants of the Rongelap and Utirik Islands from a nuclear testing accident. He helped to introduce preventative treatment with thyroid hormones to reduce the incidence of thyroid nodules and cancers. “[The Rongelap people] received about 175 r plus superficial burns from fall out. No one was killed and most of the burns have healed nicely. We examined them for any late effects.” (From: Round-robin letter to extended family, April 30, 1957)

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Rall Collection

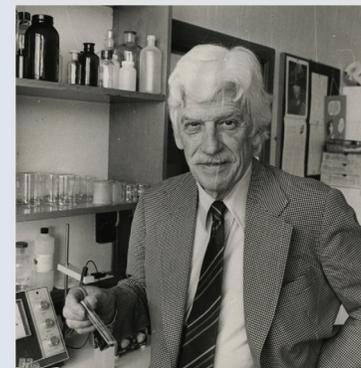
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Ed Rall (foreground) and Caroline Domm Rall, whom he met as a child and married in 1944. She had a B.S. in zoology. “[For my Ph.D. degree] I was interested in iodine compounds, and paper chromatography had just come up then. And so I chromatographed blood and serum and urine, looking for the major iodine materials.” (From: Oral history recorded by Buhm Soon Park, 2000)



“[A]n early idea before I came here—and this building exemplifies it—is to try and mix them up. That is to say, you’d have a patient wing here, then you’d have the clinical investigator’s laboratories around it, and then in the exterior wing, you’d have basic science. So that way, The clinicians could talk with the basic scientists, who were right next door, and it really worked out well.... And so I think that’s been an important aspect of the NIH, is to make sure that a clinician can talk to a biochemist, a biochemist can talk to an organic chemist, and organic chemist can talk to a chemical physicist, who can talk to a mathematician.... [T]he physical setup of this building encouraged it.” (From: Oral history recorded by Buhm Soon Park, 2000)



To learn more about the Rall collection, contact the Stetten Museum’s Hank Grasso at Hank.Grasso@nih.gov or Michele Lyons at lyonsm@od.nih.gov, or the NLM’s Head of Images and Archives, Rebecca Warlow, at rebecca.warlow@nih.gov.



“I entered medical school in 1940 and the war began in 1941...I had already started to do research in medical school and I decided that I just would not join the Army...even though about 98 percent of medical students joined...So one day the registrar called me up and said, ‘We did not have any students who are not in the military except for you...do you want a scholarship for your tuition? So I...had a scholarship and two research projects that I got paid for...and then I worked in a hospital at nights. After I graduated medical school, I had this funny inactive commission since 1941. I thought they had forgotten about me because I went through my internship and then went to the Mayo Clinic. Two weeks before I was through that first year at the Mayo Clinic, I received a letter that said report for duty.’ (From: Oral history recorded by Melissa Klein, 1998)



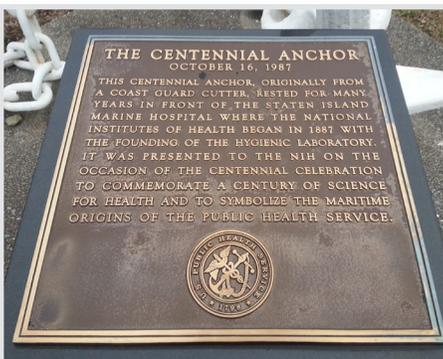
From left: DeWitt Stetten, Jr., Rachmiel Levine, Dwight Ingle, Ed Rall, and Edwin ‘Ted’ Astwood. “There were five of us visiting on an official exchange mission...Were treated with great hospitality and kindness and, I think, frankness. The biology in the USSR is quite different than that of the Western world. In Russia, Pavlov is revered and his experiments repeated endlessly.” (From: Round-robin letter to family, June 8, 1959)

The Centennial Anchor

A Symbol of NIH's Maritime Origins

BY SARA CROCOLL, PRESIDENTIAL MANAGEMENT FELLOW, NIAID

EVER WONDER WHY THERE'S A HUGE white anchor at the intersection of Center and South Drives on NIH's Bethesda campus? The Centennial Anchor, so named for the 100th anniversary of NIH's founding, symbolizes the maritime origins of the Public Health Service and NIH. Originally from a Coast Guard cutter, the anchor rested for many years in front of the Staten Island Marine Hospital (Staten Island, N.Y.), where the NIH began in 1887 as the Hygienic Laboratory, headed by **Joseph Kinyoun**. The laboratory moved from Staten Island to Washington, D.C., in 1891; changed its name to the National Institute of Health in 1930; moved to Bethesda in 1938; and became the National Institutes (plural) of Health in 1948.



BILL BRANSON

The text on the plaque for the Centennial Anchor reads:
THE CENTENNIAL ANCHOR, OCTOBER 16, 1987.

THIS CENTENNIAL ANCHOR, ORIGINALLY FROM A COAST GUARD CUTTER, RESTED FOR MANY YEARS IN FRONT OF THE STATEN ISLAND MARINE HOSPITAL WHERE THE NATIONAL INSTITUTES OF HEALTH BEGAN IN 1887 WITH THE FOUNDING OF THE HYGIENIC LABORATORY. IT WAS PRESENTED TO THE NIH ON THE OCCASION OF THE CENTENNIAL CELEBRATION TO COMMEMORATE A CENTURY OF SCIENCE FOR HEALTH AND TO SYMBOLIZE THE MARITIME ORIGINS OF THE PUBLIC HEALTH SERVICE. Seal: U.S. Public Health Service * 1798

As NIH approached 1987, its centennial year, then–Associate Director for Intramural Affairs **Philip Chen** got a call from an official at the Staten Island Marine Hospital who said that it was about to become the privatized Bayley Seton Hospital. “There’s an anchor here,” the hospital official told Chen. “Would you like it?” Not wanting to miss an opportunity to secure a piece of NIH’s history, Chen wasted no time in arranging for a flatbed truck to bring the anchor to Bethesda.

“The anchor provides some link to the maritime history of [the Public Health] Service and NIH,” said Chen. It “is a visible reminder of the original one-room Hygienic Laboratory to which NIH traces its origins.”

To celebrate NIH’s centennial, the anchor was set unadorned on the grassy traffic island at the intersection of South and Center Drives and then temporarily in front of Building 1. Shortly thereafter, on instruction by the NIH Director, it was put into storage. Then in 1989, it reappeared on the traffic island, was given proper identification and a pedestal, and has remained there ever since.

The anchor is a “powerful, enduring symbol,” said **Richard Wyatt**, deputy director of the Office of Intramural Research, who collaborated with Chen and **John Eberhart** (then senior advisor to the deputy director for intramural research)—who prepared the text for the



BILL BRANSON

The Centennial Anchor, so named for the 100th anniversary of NIH’s founding, represents the maritime origins of the Public Health Service and NIH. The anchor was brought to NIH in 1987—from the Staten Island Marine Hospital, where the NIH began in 1887 as the Hygienic Laboratory—and now sits on the traffic island at the intersection of South and Center Drives on the Bethesda Campus.

plaque—to bring about this monument to NIH history and its maritime origins.

One mystery remains, however. No one has been able to determine the exact Coast Guard cutter from which the anchor came. The lettering on the anchor should provide a clue to its origins: US NAVY; B 1860; PSI 5-45 (see photo below).

If you can shed any light on this mystery, contact the *NIH Catalyst* at catalyst@nih.gov or 301-402-1449. ●



SARA CROCOLL, NIAID



Stadtman Investigators

CONTINUED FROM PAGE 1

scientist and doing something that mattered. Structural biologist **Audray Harris** (NIAID) plans to leverage his research on respiratory viruses to design better vaccines. “The elegant yet complex nature of the biological systems [around us] never ceases to amaze” **Quan Yuan** (NINDS). Both **Lucy Forrest** (NINDS) and **Anirban Banerjee** (NICHD) study proteins in cell membranes. Forrest uses computational and theoretical approaches to study transporter proteins. Banerjee is “convinced that NIH was, without a speck of doubt, the best place to” do his research on the connection between the structure and function of eukaryotic integral membrane proteins.

All the Stadtman Investigators agree that NIH is the best place to be. The following is a synopsis of who they are. Read full interviews online at <http://irp.nih.gov/catalyst/v22i2/meet-the-stadtman>.

YEXICA (YEKA) APONTE, PH.D., NIDA



Unit Chief, Neuronal Circuits and Behavior Unit, Cellular Neurobiology Branch

Education: Undergraduate studies in

biology, Universidad Central de Venezuela (Caracas, Venezuela); Ph.D. in natural sciences at the Albert Ludwig University of Freiburg (Freiburg im Breisgau, Germany)

Training: Postdoctoral training at Janelia Farm Research Campus, Howard Hughes Medical Institute (Ashburn, Va.)

Current research: We are using state-of-the-art optogenetic electrophysiology, two-photon fluorescence endoscopy, and behavioral assays to elucidate the neuronal basis of natural behaviors, such as feeding, and determine how these behaviors are disrupted in eating disorders and drug addiction.

ANIRBAN BANERJEE, PH.D., NICHD

Unit on Structural and Chemical Biology of Membrane Proteins



Education: B.Sc. in chemistry, Jadavpur University (Calcutta, India); M.Sc. in chemistry, Indian Institute of Technology, Kanpur (India); Ph.D. in chemistry,

Harvard University (Cambridge, Mass.)

Training: Postdoctoral training at Rockefeller University (New York)

Current research: My lab combines X-ray crystallography, protein and peptide chemistry, and solution biochemical and biophysical techniques using detergent-solubilized proteins and reconstituted proteoliposomes to study the connection between the structural chemistry and biological function of eukaryotic integral membrane proteins.

KAPIL BHARTI, PH.D., NEI

Chief, Ocular Stem Cell and Translational Research Unit



Education: B.Sc. in biophysics, Panjab University (Chandigarh, India); M.Sc. in biotechnology, Maharaja Sayaji Rao University (Baroda,

India); Ph.D. in molecular cell biology, Johann Wolfgang Goethe University (Frankfurt am Main, Germany)

Training: Research fellow, Mammalian Development Section, NINDS

Last position held: Staff scientist, Mammalian Development Section, NINDS

Current research: My lab performs translational research on degenerative eye diseases using induced pluripotent stem (iPS) cell technology focusing on the retinal pigment epithelium (RPE). We are using iPS cell derived RPE to develop a cell-based therapy for retinal degenerative diseases and to develop in vitro disease models to identify patient-specific disease processes that help set up high-throughput screens for drug discovery.

LUCY FORREST, PH.D., NINDS

Computational Structural Biology Unit



Education: B.Sc. in computer-aided chemistry, University of Surrey (Guildford, England); D.Phil. in biochemistry, University of Oxford

Training: Postdoctoral research at the Johns Hopkins University School of Medicine (Baltimore), Medical Research Council Dunn Human Nutrition Unit (Cambridge, UK), and Columbia University (New York)

Position before coming to NIH: Max Planck Research Group Leader, Max Planck Institute for Biophysics (Frankfurt, Germany)

Current Research: Our group uses computational and theoretical approaches to understand the mechanisms of membrane proteins, especially transporter proteins, which capture the chemical potential energy of ionic gradients to facilitate movement of essential chemicals, or unwelcome toxic compounds, into and out of the cell.

LUCA GATTINONI, M.D., NCI-CCR

Experimental Transplantation and Immunology Branch



Education: GCE A-level, Liceo Classico G. Carducci (Milan); M.D., School of Medicine and Surgery, Università degli Studi di Milano (Milan)

Training: Residency in medical oncology, Università degli Studi di Milano and the Istituto Scientifico H.S. Raffaele (Milan)

Last position held: Staff scientist, Surgery Branch, NCI

Current research: I am planning to uncover the molecular and metabolic mechanisms that regulate CD8+ T-cell self-renewal and multipotency and use this knowledge to improve the effectiveness of T-cell-based immunotherapies by conferring “stemness” on tumor-specific CD8+ T cells.



AUDRAY KENKAY HARRIS, PH.D., NIAID

Chief, Structural Informatics Unit, Laboratory of Infectious Diseases



Education: B.S. in chemistry, Tougaloo College (Tougaloo, Miss.); Ph.D. in microbiology, University of Alabama at Birmingham (graduate of the Pharmaceutical Design Training

Program)

Training: Postdoctoral training, NIAMS

Last position held: Research Fellow, Laboratory of Cell Biology, NCI

Current Research: My lab integrates structural and biochemical studies with bioinformatics to understand the epitope display and assembly of respiratory viruses, especially the influenza virus. We use 3-D electron microscopy to obtain structural information. We hope to leverage this information to design better vaccines and to identify novel targets for therapeutic drugs.

TODD MACFARLAN, PH.D., NICHD

Head, Unit on Mammalian Epigenome Reprogramming



Education: B.S. in biochemistry and molecular biology, Pennsylvania State University (State College, Pa.); Ph.D. in cell and molecular biology,

Perelman School of Medicine at the University of Pennsylvania (Philadelphia)

Training: Postdoctoral training, Gene Expression Laboratory, Salk Institute (La Jolla, Calif.)

Current research: My group is studying the function of chromatin-modifying enzymes in mammalian development; the interplay of transcription factors and chromatin-modifying enzymes during natural and artificial reprogramming; and the mechanisms that regulate endogenous retrovirus expression during development.

STAVROULA (VOULA) MILI, PH.D., NCI-CCR

Laboratory of Cellular and Molecular Biology



Education: B.Sc. in biology, National and Kapodistrian University (Athens, Greece); Ph.D. and M.Phil. in biomedical sciences, Mount Sinai

School of Medicine of New York University (New York)

Training: Postdoctoral training, Yale University (New Haven, Conn.)

Last position: Research associate, University of Virginia (Charlottesville, Va.)

Current research: My lab is trying to understand the regulation of the RNA localization pathway and determining how its deregulation contributes to cancer progression and to neurodegeneration.

SUNNI MUMFORD, PH.D., NICHD

Epidemiology Branch



Education: B.S. in statistics, Utah State University (Logan, Utah); S.M. in biostatistics, Harvard University School of Public Health

(Boston); Ph.D. in epidemiology, Gillings School of Global Public Health, University of North Carolina (Chapel Hill, N.C.)

Training: Postdoctoral research fellow in epidemiology, NICHD

Current research: My research is on the effects of diet on both male and female reproduction and fertility. We are currently recruiting for a clinical trial to evaluate whether folic acid and zinc supplements may improve semen quality and downstream pregnancy outcomes among couples seeking fertility treatment.

For information on the Stadtman Investigators application process, go to <http://1.usa.gov/1hwmlOe>.

KANDICE TANNER, PH.D., NCI-CCR

Head, Tissue Morphodynamics Unit, Laboratory of Cell Biology



Education: B.S. in electrical engineering, technology, and physics, South Carolina State University (Orangeburg, S.C.); Ph.D. and M.S. in

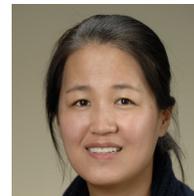
physics, University of Illinois at Urbana-Champaign (Champaign, Ill.)

Training: Postdoctoral training at University of California, Irvine; University of California, Berkeley; Lawrence Berkeley, National Laboratory (Berkeley, Calif.)

Current research: My lab wants to link the lessons learned from epithelial morphogenesis to the mechanisms by which tumor cells can colonize distant organs. We propose to treat the newly formed neoplasm as a new organ and thus dissect the physicochemical processes involved in this de novo “tumor organogenesis.”

QUAN YUAN, PH.D., NINDS

Dendrite Morphogenesis and Plasticity Unit



Education: B.S. in biology, Lanzhou University (Lanzhou, China); Ph.D. in biology, University of Pennsylvania (Philadelphia)

Training: Postdoctoral training in behavioral neurobiology, University of California, San Francisco

Research: In the short term, my lab will study the molecular and cellular mechanisms regulating the dendrite development and the wiring stability in *Drosophila melanogaster* (the fruit fly). In the long term, we try to address the principles governing the establishment, maintenance, and functions of neural circuits, and we will extend our findings into more complex model systems.



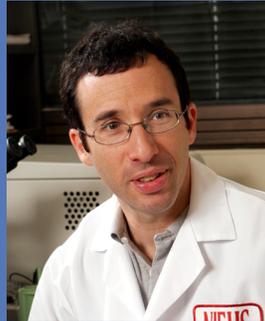
Recently Tenured



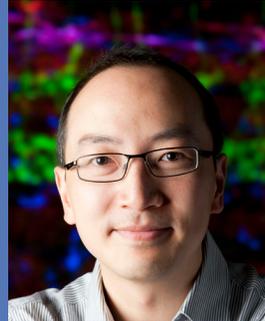
HEATHER CAMERON, NIMH



HONGLEI CHEN, NIEHS



MICHAEL FESSLER, NIEHS



WEI LI, NEI



JOSHUA MILNER, NIAID

HEATHER CAMERON, PH.D., NIMH

Senior Investigator; Chief, Section on Neuroplasticity

Education: Yale University, New Haven, Conn. (B.S. in biology); Rockefeller University, New York (Ph.D. in neuroscience)

Training: Postdoctoral training at NINDS

Came to NIH: In 1995 for training; became tenure-track investigator in 2001

Selected professional activities: Associate editor, *Journal of Neuroscience*; editorial board, *PLOS Biology*

Outside interests: Badgering her three kids to do their homework

Research interests: My laboratory studies adult neurogenesis in the hippocampus, one of only two brain areas that add large numbers of new neurons during adulthood. (The other brain area is the olfactory bulb.) We have studied the regulation of hippocampal adult neurogenesis for several years, but we are now focusing more on understanding the effect of these new neurons on the brain and behavior. It seems likely, based on their location in the hippocampus, that the function of new neurons is related to learning and memory.

However, a growing body of evidence suggests that new neurons may play a role in depression. Because memory deficits are not a primary symptom of depression, and other conditions are more strongly

associated with memory loss, it is unclear how these two potential roles for new neurons might fit together.

We have found that adult mice lacking neurogenesis show prolonged responses to stressful experiences and show increased depressive-like behavior after stress. We are interested in understanding how the new neurons affect the stress response and how their stress-buffering property relates to roles for adult neurogenesis in learning and memory and in mood disorders.

HONGLEI CHEN, M.D., PH.D., NIEHS

Principal Investigator, Aging and Neuroepidemiology Group, Epidemiology Branch

Education: Tianjin Medical University, China (M.D.); Chinese Academy of Preventive Medicine, Beijing (M.Sc. in nutritional epidemiology); Tufts University, Boston (Ph.D. in nutritional epidemiology)

Training: Research associate, Harvard School of Public Health (Boston)

Before coming to NIH: Instructor, Harvard School of Public Health (Boston)

Came to NIH: In 2005 as a tenure-track investigator

Selected professional activities: Associate editor for the *American Journal of Epidemiology*; associate editorial boards for the *American Journal of Neurodegenerative Disease* and the *International Journal*

of Molecular Epidemiology and Genetics; adjunct associate professor, Department of Epidemiology, University of North Carolina at Chapel Hill, N.C.

Outside Interests: Hiking; playing soccer

Research Interests: My group is interested in understanding the genetic and environmental factors that contribute to Parkinson disease, a neurodegenerative disorder that affects more than one million older adults in the United States. The symptoms vary, but the primary ones are tremor, or trembling in hands, arms, legs, jaw, and face; rigidity, or stiffness of the limbs and trunk; bradykinesia, or slowness of movement; and postural instability, or impaired balance and coordination. Over the past several years, my group and my collaborators have reported that moderate to vigorous exercise, ibuprofen use, higher plasma urate, and longer duration (rather than intensity) of smoking were all associated with a lower risk of Parkinson disease. As a member of an international Parkinson consortium, we've also identified genes that contribute to late-onset Parkinson disease.

Parkinson patients also suffer from a variety of nonmotor manifestations that may precede the onset of motor symptoms. To this end, my collaborators and I have reported that depression, anxiety, daytime sleepiness, constipation, weight loss, and



ESTA STERNECK, NCI-CCR

erectile dysfunction were associated with a future risk of developing Parkinson disease. We hope to further this work by evaluating how these nonmotor symptoms, alone or in combination, relate to a Parkinson diagnosis and how environment and genetic factors may alter the development of the disease.

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MICHAEL FESSLER, M.D., NIEHS

Senior Investigator, Clinical Investigation of Host Defense Group, Laboratory of Respiratory Biology

Education: Princeton University, Princeton, N.J. (B.A. in philosophy); Harvard Medical School, Boston (M.D.)

Training: Residency in internal medicine, Massachusetts General Hospital (Boston); fellowship in pulmonary sciences and critical care medicine, University of Colorado Health Sciences Center (Denver)

Before coming to NIH: Assistant professor of medicine, National Jewish Medical and Research Center (Denver)

Came to NIH: In 2006 as a tenure-track investigator

Selected professional activities: Editorial board for *PLOS ONE*; faculty member of the Faculty of 1000 Medicine; member of American Thoracic Society and NIH Translational Research Interest Group

Outside interests: Running; playing tennis

Research interests: My group studies the role of cholesterol in innate immunity, the hard-wired arm of the immune system that responds to infection, tissue injury, and other environmental stresses. We use genetically modified mouse models, lipid-raft analysis, targeted proteomic analyses, and signal-transduction approaches to define how cholesterol-trafficking mechanisms regulate the innate immune response. Our ultimate objective is to define novel molecular targets that intervene in human immunity.

Several of the studies we conduct are translational in design; we use primary human leukocytes collected from blood donors in the NIEHS Clinical Research Unit. Partnered with mouse models and insights garnered from molecular epidemiology, these studies aim to define the biology of infection and inflammation in the human lung in a way that may ultimately inform the diagnosis and care of patients with pneumonia, asthma, and a variety of environmental lung diseases.

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WEI LI, PH.D., NEI

Senior Investigator and Chief, Retinal Neurobiology Section

Education: Zhejiang University School of Medicine, Hangzhou, China (B.M. in clinical medicine); University of Texas at Houston (Ph.D. in neuroscience)

Training: Postdoctoral training at Northwestern University Feinberg School of Medicine (Chicago)

Came to NIH: In 2007 as a principal investigator in NEI

Selected professional activities: Member of the Association for Research in Vision and Ophthalmology and of its Annual Meeting Planning Committee; member of the Society for Neuroscience

Outside interests: Traveling; cooking; playing sports (tennis, skiing, and running); spending time with his son

Research interests: The Retinal Neurobiology Section studies the structure and function of retinal synapses and circuits. We are trying to understand how retinal neurons interact via synapses and how a network of these interactions, in the form of a neural circuit, transmits visual information. Such knowledge is vital for understanding the mechanisms of visual processing that are linked to information processing in the brain. This knowledge will also establish a foundation for understanding synaptic loss and dysfunction in retinal diseases and determining how to therapeutically rescue them. The retina is one of the most promising central-nervous-system areas that can be functionally mapped, thanks to its unique two-dimensional-like structure as well as to our knowledge of neuronal morphology and use of diverse techniques to assess neuronal function.

A second interest of our section is to understand how the retina adapts to extreme metabolic conditions such as those experienced by hibernating animals. We believe that metabolism is one of the core issues pertaining to the health and pathological change in the retina. By studying hibernating animals, we hope to identify strategies that can help the retina better cope with metabolic stresses that occur in retinal disease.

YOUR IDEAS WELCOME

We are always looking for ideas for stories about intramural researchers, behind-the-scenes activities that enable research to happen, new methods developed at NIH, and more. Don't hesitate to get in touch. E-mail catalyst@nih.gov or call Managing Editor Laura Carter at 301-402-1449.

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Recently Tenured

CONTINUED FROM PAGE 17

JOSHUA MILNER, M.D., S.B., NIAID

Senior Investigator, Allergic Inflammation Unit, Laboratory of Allergic Diseases

Education: Massachusetts Institute of Technology, Boston (S.B. in biology); Albert Einstein College of Medicine, New York (M.D.)

Training: Residency in pediatrics at Children's National Medical Center (Washington, D.C.); clinical fellowship in allergy and immunology at NIAID

Came to NIH: In 2003 for training; in 2008 entered the NIAID Clinical Research Transition Program; in 2009 was named chief of NIAID's Allergic Inflammation Unit as a tenure-track investigator

Selected professional activities: Councilor, Clinical Immunology Society

Outside interests: Playing hand drums; singing; produced a CD of Jewish music called "Songs at a Table"

Research interests: In the Allergic Inflammation Unit, which is a basic, translational, and clinical lab, we are trying to understand the immunology of a variety of allergic diseases from eczema to hives to asthma and those in-between. We work with patients and families who have evidence of genetic diseases associated with allergy. Through studies of patients and mouse models, we hope to gain better insights into the mechanisms of immunodysregulation that lead to atopic inflammatory disease. We have identified several new genetic diseases of allergy, continue to study the basic mechanisms that explain these and other known genetic diseases associated with allergy, and maintain a clinical program for studying these patients as well as patients with severe atopic dermatitis. Our team has found that wet-wrap therapy combined with education on long-term skin care can dramatically improve the lives of children with severe eczema.

Other work includes developing and applying techniques to determine whether certain human disorders of atopy may be caused by defects in T-cell receptor diversity or signaling function.

ESTA STERNECK, PH.D, NCI-CCR

Senior Investigator, Laboratory of Cell and Developmental Signaling

Education: Ludwig Maximilian University of Munich, Munich, Germany (M.Sc. in biology); University of Heidelberg Ruperto Carola, Heidelberg, Germany (Ph.D. in natural sciences)

Training: Predoctoral training at European Molecular Biology Laboratory and the Center for Molecular Biology (Heidelberg, Germany); postdoctoral training at the Advanced BioScience Laboratories-Basic Research Program at NCI-Frederick

Came to NIH: In 1992 for training; in 1998 obtained an NCI Scholar Grant to begin an independent research program; in 2003 became tenure-track investigator

Selected professional activities: Founding member of Austrian Scientist and Scholars in North America; founder and chair of the Washington-Frederick-Baltimore Trainee Speakers Bureau

Outside interests: Collaborates with her husband on raising two happy and decent people (currently 8 and 11 years old)

Research interests: My laboratory conducts basic research to better understand cell-signaling pathways that regulate mammary-gland development and tumorigenesis. In particular, we are investigating the function of C/EBPdelta, a transcription factor encoded by the *CEBPD* gene. We use genetically engineered mice and human breast epithelial cell lines to elucidate the

molecular mechanisms of C/EBPdelta's functions in development and tumorigenesis. In addition, we analyze human tumor tissues to guide our approaches and determine the clinical relevance of our observations. Our long-term goal is to understand the normal cell functions and perturbations that affect breast-tumor biology.

Gene-expression analyses showed that C/EBPdelta expression is downregulated in breast cancer and is part of a 70-gene expression signature that predicts longer patient survival. These studies suggested that C/EBPdelta functions as a tumor suppressor. We confirmed those findings, but we were surprised when some of our studies showed that C/EBPdelta also augments tumor metastasis and hypoxic and inflammatory signaling events, which are both associated with augmenting metastasis. We found that C/EBPdelta promotes these pathways by inhibiting expression of the FBXW7 tumor suppressor, which we now know is a critical attenuator of inflammatory signaling.

In our current research, we are further exploring the diverse functions of C/EBPdelta in tumorigenesis as well as investigating the molecular mechanisms of C/EBPdelta signaling and the switch between its different functions. We also study the role of C/EBPdelta signaling in breast-tumor cell responses to therapeutic agents. We anticipate that our research will lead to a better understanding of the complex cellular processes underlying breast cancer and treatment responses versus resistance. ●

CONTRIBUTOR: ROBIN ARNETTE, NIEHS



2015 FARE AWARDS COMPETITION

Win a travel award and enhance your CV
Submit abstract (February 14–March 17) to
<http://1.usa.gov/1cXAcvQ>

The FARE competition provides recognition for outstanding intramural scientific research. Winners will be announced by August 15, and will receive a \$1,000 travel award to facilitate the presentation of their research at a scientific meeting between October 1, 2014, and September 30, 2015. For more information, go to <http://1.usa.gov/1kqhiiT> or contact the FARE 2015 committee at FARE@mail.nih.gov.

CLINICAL & TRANSLATIONAL RESEARCH

July 7–18, 2014

NIH Main Campus in Bethesda

Application Deadline: April 1, 2014

To apply, go to:

<http://cc.nih.gov/training/phdcourse>

Learn the process of clinical and translational research from concept to implementation during this two-week intensive course. This training is offered by the Clinical Center at no cost. Those selected will be notified in May. For more information, contact the NIH Clinical Center Office of Clinical Research Training and Medical Education at 301-435-8015 or phdcourse@cc.nih.gov.

PORTER BUILDING DEDICATION AND SYMPOSIUM

March 31–April 1, 2014

March 31: 9:00 a.m.–5:00 p.m. (dedication
3:00–5:00 p.m.)

April 1: 9:00 a.m.–2:40 p.m.

Building 35

Registration deadline: March 26, 2014

Registration is free: <https://meetings.ninds.nih.gov/?ID=7263>

All are invited to a scientific symposium celebrating the completion of the John Edward Porter Neuroscience Research Center. The agenda is posted at <http://1.usa.gov/1cqGXCR>. More information about the building is at <http://orf.od.nih.gov/Construction/Current-Projects/Pages/PorterNeuroscience.aspx>.

NIH MANAGEMENT INTERN PROGRAM

Unlock a new career path

RECRUITING: April 7–11, 2014

The Management Intern (MIs) Program is a competitive, two-year career-development program for current NIH employees. Upon completion of the program, MIs transition into an administrative-management career at NIH. Eligible employees may apply. For more information, visit <http://trainingcenter.nih.gov/intern/mi>.

NIH-DUKE TRAINING PROGRAM IN CLINICAL RESEARCH

Applications accepted until April 15, 2014

The program is designed for physicians and dentists who desire formal training in the quantitative and methodological principles of clinical research. Courses are offered at the NIH Clinical Center via videoconference. Academic credit may be applied toward a Master of Health Sciences in Clinical Research from Duke University School of Medicine. For applications, contact Dora Abankwah Danso (abankwahd@mail.nih.gov). For other information, go to <http://tprc.mc.duke.edu>.

TECHNICAL SALES ASSOCIATION TENT SHOW

Wednesday, April 23, and Thursday, April 24
Parking Lot 10B

Free, but registration recommended:

<http://www.gtpmgt.com>

Don't miss this popular vendor tent show, which is usually held during the NIH Research Festival but had to be postponed because of the government shutdown in October. Many leading regional and national biomedical research suppliers will display state-of-the-art equipment supplies and services. For exhibitor list, visit <http://bit.ly/1htgKrG>.

POSTBACCALAUREATE POSTER DAY 2014

Thursday, May 1, 2014

10:00 a.m.–3:30 p.m. (keynote at noon)

Natcher Conference Center (Building 45)

Sharon F. Terry, president and chief executive officer of Genetic Alliance, will deliver the keynote address. Postbacs will share their

research. Posters will be reviewed by teams of graduate students, postdocs, and staff scientists. Investigators, staff scientists, and scientific administrators can make an important contribution to Postbac Poster Day by visiting posters and engaging their authors in discussion. For more information, visit <http://1.usa.gov/1cdqebH>.

CANCER EPIDEMIOLOGY, FROM PEDIGREES TO POPULATIONS

May 6, 2014

1:00–6:00 p.m.

Ruth L. Kirschstein Auditorium

Natcher Conference Center (Building 45)

All are invited to a scientific symposium to honor the scientific accomplishments of Joseph F. Fraumeni, Jr., M.D., founding director of NCI's Division of Cancer Epidemiology and Genetics. Agenda and registration details to follow. For more information, contact Jennifer Loukissas at loukissj@mail.nih.gov.

SCAVENGER RECEPTOR BIOLOGY AND NOMENCLATURE WORKSHOPS

NIAID recently sponsored a workshop to begin the development of a standard nomenclature for scavenger receptors. A summary of these recommendations will be published in the March 2014 issue of the *Journal of Immunology*. NIAID will be hosting follow-up sessions at three national meetings in 2014 to allow the research community to express their opinions on this newly proposed nomenclature for scavenger receptors. The three meetings are:

- Experimental Biology 2014 (April 29, 2014)
- IMMUNOLOGY 2014 (May 4, 2014)
- FOCIS 2014 (June 25, 2014)

Before the meetings, investigators from the scientific community are invited to provide their comments on the Scavenger Receptor Nomenclature Web site at <http://1.usa.gov/1jEedMh>. ●

Read more online at <http://irp.nih.gov/catalyst/v22i2/announcements>.

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CATALYTIC REACTIONS?

IF YOU HAVE A PHOTO OR other graphic that reflects an aspect of life at NIH (including laboratory life) or a quotation or confession that scientists might appreciate and that would be fit to print in the space to the right, why not send it via e-mail: catalyst@nih.gov; fax: 301-402-4303; or mail: *The NIH Catalyst*, Building 1, Room 333.

Also, we welcome “letters to the editor” for publication and your reactions to anything on the *Catalyst* pages.



Dale Lewis, a staff scientist in NCI's Laboratory of Molecular Biology, took the prize-winning photo (above, right).

The NIH Catalyst is published bimonthly for and by the intramural scientists at NIH.

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<http://irp.nih.gov/catalyst>

PHOTOGRAPHIC MOMENT

Watching Window Washers



DALE LEWIS, NCI

Dale Lewis (NCI) won first place and second place in the third annual “In-Focus Safe Workplaces for All” photography contest. (His first-place image appeared in January–February issue of the *NIH Catalyst* at <http://irp.nih.gov/catalyst/v22i1/photographic-moment>.) The above image features a crew of window washers at the new addition of the Porter Neuroscience Research Center. Lewis, who has been at NIH for more than 19 years, also likes to photograph historic buildings, monuments, animals, flowers, and people. The contest, sponsored by the Division of Occupational Health and Safety in the Office of Research Services, challenged anyone with a passion for photography to use their imagination and creativity to capture an image of workplace safety and health and share it with the NIH community.

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